

What is claimed is:

1. An external drive assembly for use with an impeller of a supercharger comprising:  
a multibelt pulley adapted to receive a drive source;  
an impeller pulley drivingly coupled to the impeller;  
5 an external drive belt having at least one rib coupled to the multibelt pulley to drive the impeller pulley;  
an adjustable idler engagingly connected to the external drive belt;  
wherein the impeller pulley and the multibelt pulley engage with the at least one rib of the external drive belt.
- 10 2. The external drive assembly according to claim 1 wherein the adjustable idler is spring loaded.
3. The external drive assembly according to claim 1 further comprising an internal drive assembly for coupling the impeller pulley to the impeller.
4. The external drive assembly for use with a supercharger according to claim 2  
15 wherein the external drive belt is selected from the group consisting of:  
serpentine belts, polydrive belts or toothed belts.
5. The external drive assembly for use with a supercharger according to claim 4 wherein the multibelt pulley engages at least the external drive belt and a motor belt.
- 20 6. The external drive assembly for use with a supercharger according to claim 5 wherein the multibelt pulley is adapted to receive a rotatable shaft of an existing engine component.

7. The external drive assembly for use with a supercharger according to claim 6 wherein the multibelt pulley replaces the pulley of the existing engine component.

8. A supercharger comprising:

5                   an impeller having a body with a base and an air intake end and further having precision made air vanes attached to the body wherein the precision made air vanes each extend from the base to the air intake end;

                  and a volute chamber housing having a precision made inner area wherein the precision made air vanes and the body are positioned within the volute chamber housing;

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                  an external drive assembly coupled to the impeller for driving and rotating the impeller; and

                  a drive assembly mount to which the external drive assembly is coupled.

9. The supercharger according to claim 8 wherein the precision made air vanes have an air sealing surfaces and wherein the air sealing surface of the precision made air vanes are precisely spaced relative to the precision made inner area.

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10. The supercharger according to claim 9 wherein the impeller further comprises: an air foil attached to each of the precision made air vanes near the air intake end of the body wherein each air foil creates air pressure difference to at least provide increased drawing of air into the volute chamber housing when the body is being rotated.

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11. The supercharger according to claim 10 wherein the air foil is attached to each of the precision made air vanes near the air intake end of the body such that at least a portion of the air foil extends above the air intake end of the body so that at least a vortex action is created thereat.
- 5 12. The supercharger according to claim 8 wherein the precision made air vanes of the impeller have thicker walls towards the air intake end of the body and thinner walls towards the base.
13. The supercharger according to claim 8 wherein each of the precision made air vanes of the impeller further comprises at least one groove located along each of the sealing surfaces.
- 10 14. The supercharger of claim 8 further comprising a compressing surface wherein the compressing surface and the precision made inner surface form an air compression outlet.
- 15 15. The supercharger of claim 14 wherein the compressing surface is a compression ring.

16. The supercharger according to claim 8 wherein the external drive assembly comprises:

5 a multibelt pulley adapted to receive a drive source;  
an impeller pulley drivingly coupled to the impeller;  
an external drive belt having at least one rib coupled to the multibelt pulley to drive the impeller pulley;  
an adjustable idler engagingly connected to the external drive belt wherein the impeller pulley and the multibelt pulley engage with the at  
10 least one rib of the external drive belt.

17. The supercharger according to claim 16 wherein the adjustable idler is spring loaded.

18. The supercharger according to claim 17 further comprising an impeller shaft wherein the impeller shaft is coupled to the impeller pulley and the drive  
15 assembly mount and the impeller.

19. The supercharger according to claim 18 further comprising at least two impeller bearing assemblies coupled to the impeller shaft and fitted to the drive assembly mount.

20. The supercharger according to claim 19 wherein the impeller shaft is hollow.

21. The supercharger according to claim 19 wherein the at least two impeller bearing assemblies have ceramic ball bearings.

22. The supercharger according to claim 19 wherein the at least two impeller bearing assemblies further comprise teflon seals and have ball retainer races

selected from group consisting of aluminum ball retainer races and plastic retainer races.

23. The supercharger of claim 17 further comprising an internal drive assembly for coupling the impeller to the impeller pulley.

5 24. The supercharger according to claim 17 wherein surfaces of the multibelt pulley and the impeller pulley are cryogenically treated.

25. The supercharger according to claim 17 wherein surfaces of the multibelt pulley and the impeller pulley are hard anodized.

10 26. The supercharger of claim 17 wherein the at least one engaging rib of the multibelt pulley and impeller pulley is selected from the group consisting of the engaging ribs having longitudinal components, transverse components and combinations thereof.

27. The supercharger of claim 26 wherein the external drive belt is selected from the group consisting of serpentine belts, polydrive belts or toothed belts.

15 28. The supercharger of claim 17 wherein the multibelt pulley engages at least the external drive belt and a motor belt.

29. A method of making a supercharger comprising the steps of:

providing a impeller having a body with a base and an air intake end and  
further having precision made air vanes attached to the body wherein the

5 precision made air vanes each extends from the base to the air intake end and  
wherein the precision made air vanes have air sealing surfaces;

positioning the impeller in a precision made inner area of a volute chamber  
housing;

precisely spacing the air sealing surfaces of the precision made air vanes  
10 relative to the precision made inner area;

coupling an external drive assembly to the impeller for driving and rotating  
the new impeller; and

coupling the external drive assembly to a drive assembly mount.

30. The method of making a supercharger according to claim 29 wherein the

15 coupling the external drive assembly step further comprises the steps of:

providing a multibelt pulley adapted to couple to a drive source;

coupling an impeller pulley to the impeller and to the drive assembly mount,  
and coupling an external drive belt to the multibelt pulley and the impeller pulley  
wherein the external drive belt is being driven by the multibelt pulley to drive the  
20 impeller pulley.